

### REMARKS/ARGUMENTS

Applicants thank Examiner Marcheschi for the courtesy of an interview extended to Applicants' representative on August 26, 2008. During the interview Applicants claims were discussed with respect to potential amendments in relation to *Menzel*. Additionally, powders P<sub>3</sub> and P<sub>4</sub> of Table 1 and their corresponding dispersions of Table 2 were discussed.

Arguments similar to those discussed are reproduced below.

#### **Claim Status**

Claims 1-10 are pending. Claims 5 and 6 are withdrawn pursuant to a previous Restriction Requirement. Claims 1 and 3 are currently amended. Claims 7-10 are added. Amended claim 1 finds support in the specification: page 8, line 9. Claim 3 is amended for grammatical purposes. New claim 7 finds support in the specification: page 6, lines 5-7. New claims 8 and 9 find support in the specification: page 6, lines 19-23. New claim 10 finds support in the specification: page 4, lines 20-23. No new matter has been entered.

Claim 3 is rejected under 35 U.S.C. §112, second paragraph, for being indefinite with respect to the term "additives". Claims 1, 3 and 4 are rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over *Menzel*. Claims 2 and 4 are rejected under 35 U.S.C. §103(a) as obvious over *Menzel* and *Schroeder*.

Applicants respectfully traverse these rejections.

#### **Background**

The current invention relates to an aqueous dispersion for the chemical-mechanical polishing of metallic films. Semiconductor manufacturing processes generally incorporate a chemical-mechanical polishing step, during which excess metal is removed (specification: page 2, lines 3-5). It is desirable for the dispersions used in chemical-mechanical polishing to

exhibit elevated metal film to barrier layer selectivity (specification: page 2, lines 5-7).

Dispersion containing aluminium oxide are normally used for this purpose (specification: page 2, lines 8-9). However, the disadvantage of such dispersions is that they often have low stability in the pH range between 4 and 7 (specification: page 2, lines 9-10). Additionally, flocculation may occur which makes it impossible to achieve reproducible polishing results (specification: page 2, lines 11-12). Furthermore, the selectivity between the barrier layer and metal film may not be adequate and over-polishing may occur (specification: page 2, lines 12-14). Accordingly, the current invention provides an aqueous dispersion having improved stability and which exhibits an elevated metal removal rate combined with a low barrier layer removal rate during chemical-mechanical polishing processes (specification: page 3, lines 3-7).

#### **Applicants' Claims Not Anticipated by *Menzel***

Applicants point out two sections of the M.P.E.P. that address the anticipation of ranges (2131.03) and genus-species situations (2131.02):

In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with "sufficient specificity to constitute an anticipation under the statute." If the claims are directed to a narrow range, and the reference teaches a broad range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. (2131.03, Part II) (emphasis added)

If one of ordinary skill in the art is able to "at once envisage" the specific compound within the generic chemical formula, the compound is anticipated. One may look to the preferred embodiments to determine which compounds can be anticipated. (2131.02, 3<sup>rd</sup> Section) (emphasis added)

*Menzel* discloses aqueous dispersions comprising silicon-aluminum mixed oxide powder (Abstract). More specifically, *Menzel* discloses a content of the Si-Al mixed oxide

powder being 0.1-70 wt%, preferably 1-30 wt% ([0023]), and an Al oxide content of the powder being 0.1-99.9 wt% (Abstract). Furthermore, *Menzel* discloses working examples comprising 12.5, 25 and 35-55 wt% of Si-Al mixed oxide powder. This is quite different from Applicants' narrowly claimed range of 1-5 wt% of Si-Al mixed oxide powder (see claim 1). Additionally, *Menzel* discloses working examples comprising 66 or 0.25 wt% Al oxide in the powder. Again, this is quite different from Applicants' narrowly claimed range of 90-99.9 wt% of Al oxide in the powder (see claim 1). Accordingly, given the broad ranges of *Menzel* and *Menzel's* lack of working examples within the narrow ranges as claimed by Applicants, one skilled in the art (1) would not consider the broad ranges as disclosed by *Menzel* to have "sufficient specificity" to be anticipatory of Applicants' claimed ranges as described by M.P.E.P. 2131.03 (see above), and (2) would not consider the broad ranges as disclosed by *Menzel* to allow one skilled in the art to "at once envisage" Applicants' narrower ranges as described by M.P.E.P. 2131.02 (see above).

#### **Applicants' Claims Not Rendered Obvious by *Menzel***

Applicants point out M.P.E.P. 2144.05, Part III, that states: "Applicants can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range" (emphasis added).

As discussed above, *Menzel* discloses an Al-oxide content of the Si-Al mixed oxide powder being 0.1-99.9 wt%, with all working examples having either 66 wt% or 0.25 wt% of Al-oxide (see above). In contrast, Applicants' claimed dispersion comprises 90-99.9 wt% of Al-oxide in the Si-Al mixed oxide powder (see claim 1). Furthermore, Applicants' specification shows that when the powder has an Al<sub>2</sub>O<sub>3</sub> content of 67 wt% (see powder P<sub>4</sub> of Table 1), which is very similar to *Menzel's* examples having 66 wt% (see Dispersions 1-3), the resulting dispersions (i.e., D<sub>4/2</sub> and D<sub>4/5</sub> of Table 2) have inferior stability. More

specifically, when the Al-oxide content is outside the range as claimed by Applicants but almost identical to that exemplified by *Menzel*, the resulting dispersions show separation after 14 days without an oxidizing agent, separation after 24 hours with an oxidizing agent, and slight evolution of oxygen after 24 hours with an oxidizing agent (Table 2).

In contrast to the comparative powder P<sub>4</sub> that is almost identical to that of *Menzel*, exemplary powder P<sub>3</sub> (Table 1) has an Al-oxide content that is within the narrow range as claimed by Applicants (i.e., 91 wt%). As can be seen by dispersions D<sub>3/2</sub> and D<sub>3/5</sub> of Table 2, that use the exemplary powder P<sub>3</sub>, no separation is obtained after 14 days without an oxidizing agent, and only slight separation and slight evolution of oxygen is obtained after 24 hours with an oxidizing agent (Table 2). Accordingly, as criticality of the narrower claimed Al-oxide content range (i.e., 90-99.9 wt%) has been shown as compared to the much broader range as disclosed by *Menzel* (i.e., 0.1-99.9 wt% with only 0.25 and 66 wt% exemplified), Applicants' claims are non-obvious in view of *Menzel*.

Lastly, as *Schroeder* is used merely for its disclosure of conventional amounts of oxidizers used in polishing compositions (see Office Action, page 5), and *Schroeder* does not disclose the other elements of Applicants' dispersion as found in claim 1, the combination of *Menzel* and *Schroeder* cannot render obvious Applicants' claims for the same reasons as those discussed above with respect to *Menzel* alone.

### **§112 Rejection**

Claim 3 is rejected for the indefinite term "additives". Applicants note that the term additives is defined in the specification (page 4, lines 20-23). Additionally, one of ordinary skill in the art would understand "the metes and bounds" of additives as claimed by Applicants in claim 3. This is evidenced by US 7,297,632 (claim 14), US 7,186,655 (claim 6) and US 7,166,014 (claim 4), as a few examples, of CMP claims referring to "additives"

generically without further definition. Thus, just as these patents of similar art are presumed valid and definite, Applicants' claim 3 should also be considered definite. In addition, claim 10 has been added to include a list of specific additives. Accordingly, this rejection has been obviated and Applicants respectfully request its withdrawal.

### **Request for Rejoinder**

Upon making a determination of allowable subject matter for product Claim 1, the Office is requested to rejoin and allow process Claims 5 and 6 pursuant to M.P.E.P. 821.04 (b) which states that "if applicant elects a claim(s) directed to a product which is subsequently found allowable, withdrawn process claims which depend from or otherwise require all the limitations of an allowable product claim will be considered for rejoinder". Claims 5 and 6 contain all the limitations of product Claim 1; therefore rejoinder is appropriate if Claim 1 is found allowable.

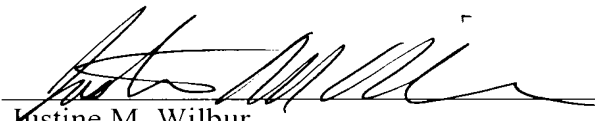
### **Conclusion**

For the reasons discussed above, Applicants submit that all now-pending claims are in condition for allowance. Applicants respectfully request the withdrawal of the rejections, withdrawal of the restriction requirement, and passage of this case to issue.

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